8:Panikkar I-4, 5 (no date) 1918 AWll Kerala AWll Nayar

valent among them also. The more one looks into these matters the more one becomes clear that in the unorganised and uneducated human mind, be it "civilised" or be it primitive, there is a horizontal stratification of the most contradictory ideas, which lie absolutely undisturbed in the ordinary course of life. In the mind of the ordinary man whose *forte* is not clear thinking, a great deal of intermingling of such ideas might take place. It is no uncommon sight to see a thoroughly Hindu-ised Nāyar who talks about Absolutism and Illusion, and believes in them, paying a *Kāniyin* to get the devil out of his little niece. This is, perhaps, the truth which lies midway between those who assert, like Dr. Frazer, that magic and religion are hostile and cannot be reconciled, and those who, like Dr. Marett, hold that in their origin they are the same, that it is in their character as looked upon by society they differ. The view I have maintained here is that religion and magic are different in their psychological and emotional effects and that Dr. Frazer is right when he says that they are at bottom hostile. But the almost universal coexistence of magic and religion is due to the attitude of society which tolerates all contradictions and insists only on their effect being for social welfare.

VII.—THE MATERIAL CULTURE OF THE NĀYARS.

Occupation.—The Nāyars are at present an essentially agricultural population. The vast majority of them are peasant proprietors owning small farms. Rice and coco-nuts are the chief things cultivated, though in North Malabar pepper and cardoman have also their share.

With regard to these matters the Nāyars have attained a certain stage of excellence. Their coco-nut estates are planted with a considerable amount of scientific skill and they are proficient in the industries which are allied to coco-nut cultivation; such as coir-matting, copra making and extraction of coco-nut oil. The extreme fertility of the land has made agricutural chemistry, as far as coco-nut and rice cultivation are concerned, a matter of secondary importance; and even to-day there are very few Nāyars who have studied the Western methods of agriculture.

As each Nāyar family generally lives in a compound of its own, coco-nut cultivation is generally in small farms. Extensive coco-nut plantations owned by the same man are very few. The position is much like that in England before the Enclosures. Even if all the land in a particular area is owned by the same person it is seldom enclosed and transformed into one large estate. On the other hand, they continue to be regarded as separate compounds and the houses on them are generally occupied either by Nāyar tenants or by Pulaya slaves.

The fact that Nāyar families live in garden houses is one of great significance. Horticulture is practised with great interest in all families, rich as well as poor. It is, in fact, very seldom that any Nāyar family uses vegetables bought from the market.

11: India G-4, 5 (1960-1961) 1962 AWll Kerala AWll

formed of gneissic debris by sub-aerial decomposition. The formation of coastal areas consists mostly of sands deposited by the sea. The soils are generally of poor fertility status. Some peculiar formations are found in the taluks of Ambalapuzha, Kuttanad, Vaikom and Shertallai and go by the name *peaty* or Kari soils. These are black and heavy and contain plenty of potash and 10 to 30 per cent organic matter. However, the soils are highly acidic due to the decomposition of organic matter under anaerobic conditions, presence of iron and aluminium salts and absence of nitrification. Attempts to reclaim the soils by liming and improvement of drainage have so far proved unsuccessful. In Trichur and Mukundapuram taluks there is yet another category known as *Kole* soils. These are fertile alluvial soils. The soils of Malabar area are quite different. They are mostly red soils formed *in situ* from the micaccons or granitic rocks below under the influence of weather and climatic conditions. The fertility of the red soil is poor. They contain very low proportions of organic matter and nitrogen. But these soils contain ferrous and aluminium ions in fairly large proportions and in the absence of humous this situation results in reversion of phosphate—a state where phosphorous when applied in the form of fertilizers, does not become readily assimilable by the plants.

Land Utilization

2.9 The fact that Kerala has drawn upon the margin of cultivable land much more than in the rest of India is borne out clearly by Table 8.2A The net sown area in the State during 1956-57 was 4,525,000 acres, that is 47.16 per cent of the total area. This is about 8 per cent more than corresponding all-India proportion (39.1%). The proportion of fallow lands in Kerala is also very low. (Kerala 4.4% : all-India 7.5%). A higher proportion of total area devoted to cultivation becomes all the more significant in view of the fact that forests cover about 26 per cent of the total area of the State compared to the all-India average of 17.44 per cent.

2.10 During the period 1951–57, there has been an overall improvement in the pattern of land utilization in the State. There have been significant increases in the area under forests (15.8%), permanent pastures (19.8%), land under tree crops (18.1%), net area sown (29.8%), and the area sown more than once (24.9%). These increases were mostly at the expense of cultivable waste, which declined by about 40 per cent during the period. The next important decline (16.7%) was in the barren and uncultivable lands. The area sown more than once rose by about 25 per cent, but this was partly offset by an increase of 35 per cent in the area under current fallows. (Table 8)2A

2.11 Another notable feature of the agricultural sector in Kerala is the high intensity of cropping.[1] During 1956-57, the gross sown area was 5.6 million acres and the net sown area was 4.7 million acres. This works out to a crop intensity of 119 per cent (all-India 113%; Punjab 130%; Maharashtra 120%). However, if the field crops alone are taken into account, crop intensity works out to as high a figure as 150 per cent. It is the latter percentage which gives a more accurate idea of the

[text continues on p. 25]

[1] Intensity of cropping is the ratio between gross cropped and net cropped area.

2A [see p. 274, category 116 -- Analyst]

11: India G-4,5 (1960-1961) 1962 AW11 Kerala AW11

*433 249 2.37 The lemon grass oil industry in Kerala has good scope for expansion provided the prices are kept competitive. However, since the Second World War some of the Latin American countries have started cultivation of lemon grass on a commercial scale and extraction of oil with efficient methods of distillation. Compared to these countries both the yield of grass as well as its oil content are low in Kerala. Internal demand is also likely to increase considerably in view of the new synthetic chemical industries that are going to be set up within India in the near future. It is, therefore, suggested that the present level of output of lemon grass oil may be raised through measures such as manurial trials, evolution of high yielding and quick maturing strains, control of pests and diseases, designing of efficient stills of small capacity to suit the needs of small growers, etc.

MEASURES FOR INCREASING PRODUCTIVITY

*433 2.38 Replacement of some of the low value crops by high value ones, as indicated above, should be taken up side by side with raising the yield rate of different crops. There is good scope for increasing the yields which can be achieved through (*i*) greater coverage by improved seeds, (*ii*) larger application of manures and fertilizers, (*iii*) increase in irrigation facilities, and (*iv*) improved agricultural practices. These measures are discussed separately in the succeeding pages.

Improved Seeds

*433 242 2.39 Improved seeds are found to increase the yields by 10 to 15 per cent, on an average, while in case of certain crops like sugarcane, hill paddy, groundnut, etc., the output may even go up by 25 per cent. The area covered by improved seeds is very low in Kerala except in the case of paddy and sugarcane, where it is as high as 50 per cent and 90 per cent respectively of the area under these crops. Farmers in Kerala are aware of the benefits of higher productivity of improved seeds, but are unable to take advantage of it owing to inadequate supplies and delay in delivery. According to the Department of Agriculture, the improved strains available with them are suitable to cover about 60 per cent of area under paddy in the State.

2.40 Complete replacement of local seeds by improved seeds would require a large number of strains which can suit all conditions. Evolution of new strains either by breeding or by selection is a long term process requiring facilities and funds. A programme of full coverage is possible only when the number of seed farms to produce and multiply the necessary seeds is large enough. By the end of the Second Plan, the State was expected to have 24 seed farms in addition to a large number of certified growers who were to multiply the nucleus seeds.

2.41. During the next 10 to 15 years the State should aim at complete replacement of local seeds by improved seeds. For a programme of this size, the existing number of seed farms and certified private farms would have to be increased considerably. Due to difficult terrain and scarcity of land, the area of a seed farm in Kerala generally does not exceed 15 acres—of which only one-third may be suitable for wetland cultivation. The number of nucleus seed farms to cover a given area with

11: India G-4, 5 (1960-1961) 1962 AW11 Kerala AW11

improved seeds would, therefore, be much larger in Kerala than elsewhere in the country. For full coverage of the area by improved seeds, it is estimated that by 1971, 120 new farms would have to be organized. Investment on each of these farms, including a seed store, would be about Rs. 75,000. Total investment on additional seed farms would, therefore, amount to about Rs. 90 lakhs. Assuming an increase of 10 per cent in yield, additional production due to full coverage from improved seeds by the end of the Fourth Plan would be about 75,000 tons of foodgrains alone. Similar increases may be achieved for other agricultural commodities also.

Manures and Fertilizers

2.42 The soils of Kerala are not fertile. Being of lateritic origin they are highly porous. More than 50 per cent of the cultivated soils contain less than 15 per cent of clay complex. Continuous cropping accompanied by heavy leaching (a direct consequence of heavy rainfall) has made the soils extremely deficient in phosphates, nitrogen and potash, and also in calcium, magnesium and other minor elements.

2.43 Inspite of the poor fertility of soils, the crop yields are good. This is primarily due to the application of a large amount of organic manures to the fields. In addition to organic manures, the farmers also use fertilizers. Farmers of Kerala were among the first to realize benefits of fertilizers and put them to use. But the quantity used is small owing to inadequate supplies. Even a modest consumption target of 14,200 tons of fertilizers[1] per annum for the Second Plan had to be revised to 5,800 tons on account of this shortage. During 1958-59, the State consumed 5,000 tons of nitrogenous ferilizers mostly in the form of ammonium sulphate and potassic fertilizers. This works out to roughly 1.2 lbs. per acre of nitrogen and less than 0.1 lb. per acre of phosphate and potash.

2.44 In future, the emphasis should be placed both on manures and on fertilizers. Organic manures, in addition to providing the plant nutrition, help in conditioning the soil, whereas fertilizers are necessary for supplementing nutritional needs which the organic manures are not able to provide fully. A joint and balanced application of organic manures and fertilizers is, therefore, necessary for getting the desired results.

2.45 All possible sources in the State should be fully exploited for increasing the supply of organic manures. There is scope for greater utilization of urban wastes and green leaves. There is also scope for fuller utilization of the existing production of press mud and for increasing the supply of green matter by raising green manure plants on the borders of fields and banks of river streams. The supply of organic manures may be further augmented by fuller utilization of fish waste and inedible or spoilt fish. Such possibilities should be investigated.

2.46 As emphasized above, a desired level of crop nutrition will not be possible unless manures are adequately supplemented by fertilizers. The supplementary dosage of fertilizers differs from crop to crop depending upon the nature of the crop, length of the growing period and the yield rates. The dosage is the highest for banana, with NPK (Nitrogen, Phosphorous and Potash) ratio at 150 : 150 : 300 lbs.

[1] 9,680 tons of N, 3,720 tons of P_2O_5 and 840 tons of K.

11: India G-4, 5 (1960-1961) 1962 AWII Kerala AWII

2.66 *Surface Reservoirs*: Adequate provision should be made for silting capacity in tanks and reservoirs. In the case of small tanks at least about 20 per cent of the total capacity should be reserved for silting.

2.67 *Prevention of Ingress of Salt Water*: Large areas of cultivated land in Kerala are well below the mean sea level and are subject to flood by fresh water brought over by rivers in the monsoon season and salt water during other seasons. There is need for construction of suitable projects to prevent the onrush of salt water into the paddy fields. The scheme to dewater such areas should also form an important item in the minor irrigation programme.

2.68 No estimates are available for the likely area that could be irrigated from minor irrigation works. Nevertheless, it is considered to be quite substantial. It is learnt from discussions with the State Government authorities that the extent of such possibilities is around 300,000 acres. Of this, the share of lift irrigation and ground water utilization (wells, filter points, etc.) may be put at 100,000 acres. Lift irrigation and ground water utilization are works of a small size and, therefore, should be undertaken by the beneficiaries themselves with the help of Government aid.

2.69 In view of the emphasis laid on minor works, it is suggested that 200,000 acres of area (this also includes area benefited from flood control and drains) should be developed from minor irrigation sources. Of this, about half may be from lift irrigation and ground water sources. The average capital cost of providing minor irrigation would be in the neighbourhood of Rs. 1,000 per acre. Total investment for minor irrigation development schemes as suggested above would come to Rs. 20 crores. Of this Rs. 10 crores would be in the public sector and the rest will have to be provided by individual agriculturists.

2.70 The minor irrigation schemes proposed here would benefit not only rice, but also other crops such as arecanut, lemon grass and banana. For purpose of calculations it may be assumed that only half of proposed irrigation is used for rice. The additional production of rice on account of minor works would thus be about 50,000 tons annually by 1970-71.

Improved Agricultural Practices

2.71 Agricultural practices in Kerala are relatively of advanced type. Rice, the principal food crop of the State, is cultivated quite intensively. Transplanting is practised all over the State, even under the submerged type of cultivation. In case of dry seed bed crops like tapioca, ginger, groundnut, etc., the farmers generally take care to see that interculture and earthing operations are satisfactorily done.

2.72 However, there is further scope for increasing crop yields by improving the agricultural practices and techniques. Improved practices such as scientific crop rotation by including a legume crop as against the existing practice of successive rice crops, deep ploughing, adequate plant protection, etc., can increase the yields to some extent.

2.73 With the proposed increase in irrigated area it would be possible to raise a third crop of pulses either of black gram or green gram in succession to two crops

11: India G-4,5 (1960-1961) 1962 AW11 Kerala AW11

of paddy. This would not only give additional production of pulses which are deficit in the State, but also enrich the soil by leaving a nitrogen residue, and thereby constitute a better rotation. It may be possible to develop pulse crops on 250,000 acres. Assuming an yield of a quarter ton per acre, the additional production of pulses by crop intensification, as suggested here, would be roughly 62,500 tons per year.

2.74 Better plant protection is another measure for getting a substantial increase in yields. It is estimated that yields increase approximately by about 10 per cent through this method. The Department of Agriculture should tackle this problem more effectively. This would only be possible by strengthening the Plant Protection Wing of the Department of Agriculture.

Implements

2.75 Agricultural implements in use in the State are antiquated and inefficient. The wooden plough continues to be the master implement and is used for tillage operations of almost all the crops. Iron ploughs and other tillage implements are not popular. In fact the number of iron ploughs decreased by 22 per cent during 1951–56 and at present stands at 10,225. Tractors during the same period, however, increased from 59 to 187. Irrigation pumps too have shown an increase of 116 per cent.

2.76 The slow adoption of improved implements is mostly due to non-availability of implements and machinery suited to local conditions as well as due to their high cost. The topographical conditions and techniques of cultivation are unique in Kerala and there are no implements designed and developed to suit such conditions. There is, therefore, need for developing efficient implements for rice cultivation, plantation crops, soil conservation work and also for specialized implements such as ridgers and earthers for ginger and tapioca. It would be necessary to have a well equipped and adequately staffed agricultural engineering station to undertake the type of work suggested here. The proposed station may also do some work in designing of irrigation aids and may advise farmers on the selection of pumping sets and cane crushers.

Soil Erosion

2.77 Soil erosion is a serious problem in Kerala. Conditions prevalent in the State such as lateritic soils, undulating to steep topography, the system of farming followed and heavy cloud burst—all these constitute towards excessive soil erosion. There is no reliable estimate regarding the extent of area affected or vulnerable to soil erosion, but it is estimated that about one-third of the cultivated area—approximately 1.5 to 2 million acres—is affected by it. It should be possible to protect at least one million acres through soil conservation measures by 1971.

2.78 Soil conservation work as carried out by the Department of Agriculture has become very popular with the farmers. The Department gives technical advice on soil conservation matters and undertakes operations in specified areas in water-shed units.

11: India G-4, 5 (1960-1961) 1962 AWll Kerala AWll

2.85 The country is deficit in the output of coconuts and annually imports about Rs. 15 crores worth of copra and coconut products. This is a heavy drain on foreign exchange resources of the country. Even after imports the total available supply of coconuts is not enough and the oil millers are, therefore, hard hit by this shortage. The demand for this commodity is increasing year after year while the production has been more or less stagnant at 3,100 million nuts. If this situation is allowed to drift unchecked, imports of coconuts will have to be increased progressively. In view of these factors, measures to increase productivity and the output of coconut are of extreme urgency.

2.86 Coconut cultivation in the State today faces a multitude of problems. The average yields are only about 40 nuts a tree per annum, that is, 3,000 nuts an acre, as against 60 to 100 nuts per tree in Philippines and some of the other Far Eastern countries. Moreover, the yield has shown no tendency to increase over the last 10 years. The focal point of coconut development programme, therefore, should be to break through the stagnant levels of productivity of coconut. The following discussion follows this line of argument.

2.87 Poor yields are largely due to the absence of regular and adequate manuring. The crop needs large quantities of manure. But the farmers, majority of whom are poor, cannot afford to spend on fertilizers which in the case of coconuts show results only after two or three years. Farmers, therefore, prefer to invest whatever resources they have in manuring the field crops which bring in quicker returns. Coconuts thus get neglected. In addition to starving the coconut trees of fertilizers, many farmers grow exhaustive crops such as banana and tapioca as an understorey. This practice exhausts the soil and it needs large funds and a long period ranging from 3 to 5 years, to rehabilitate such gardens.

2.88 To raise the yields, an intensive application of fertilizers containing NPK has been recommended by the Indian Central Coconut Committee. The Committee is of the opinion that fertilizers are more suited to acidic soils on which coconut is generally grown in Kerala. It estimates the cost of requisite fertilizers to be of the order of Rs. 93 per acre per annum but that is beyond the means of a small farmer. It is, therefore, suggested that the State should arrange to advance loans for the purchase of fertilizers, and these loans may be recovered after three years. To start with, 30 per cent of the area may be brought under this programme. The annual requirement of fertilizers would be about 26,000 tons of superphosphate. The programme would cost Rs. 3 crores per year, that is, Rs. 9 crores for the first three years after which the loans may be granted out of the recoveries. The programme may be extended to cover 75 per cent of the area earmarked for coconut during the Fourth Plan. Better manuring coupled with the necessary cultural operations, can raise the yields from 40 nuts to 60 or 70 nuts per tree which would thus amount to an increase of 50 to 75 per cent over the present rate of production.

2.89 Coconut crop is subject to a heavy incidence of diseases and pests. The diseases such as "leaf rot" and "root diseases" are rampant and widespread and have spread to six districts affecting over 30 per cent of the trees in the State. The annual loss of production due to these diseases is estimated at Rs. 2 to 3 crores. There is already a scheme in force to spray about 7 million trees in the infected pockets.

11: India G-4, 5 (1960-1961) 1962 AW11 Kerala AW11

But mere treatment of infected trees is not enough. The healthy trees lying side by side, or trees exposed to infection, should also be sprayed as a preventive measure. The proposed plant protection programme should cover the whole State in progressive stages by the end of the Fourth Plan. This would cost about Rs. 5 crores during the next 10 years, but a part of this may be recovered from the farmers as spraying charges.

2.90 Coconut is mostly grown as an unirrigated crop. During the summer months they are drought-affected in many parts of the State and drought has a telling effect on the trees. It is found that under irrigated conditions, the trees regularly give higher yields and there is very little premature shedding of buttons. It is, therefore, suggested that the Department of Agriculture should start popularizing irrigation of coconut gardens. Filter point tube-wells and pumping sets would be suitable as means of irrigation and the State should arrange for loans on easy terms for their installation.

2.91 The average economic life of a coconut tree is about 60 years. It is estimated that over 50 per cent of the trees in the State are over 50 years old and, therefore, in about 10 years, these trees would be past their economic life. Unless immediate steps are taken to replace the aged trees, the production of nuts after a few years is bound to decline in spite of all the measures suggested so far. A campaign should, therefore, be launched to replace old trees by fresh plantings.

2.92 There is not much scope for extending the area under coconut since most of the suitable area has already been brought under the crop. This is particularly so in the former Travancore-Cochin area. However, there is some possibility of raising new coconut plantations in the interior strip of Malabar along the foot of the western ghats. The Indian Central Coconut Committee estimates this area to be of the order of 100,000 acres. It is suggested that Government should make all efforts to bring this area under coconut cultivation. There are some difficulties in the way of bringing about the extension of area, for example, lack of adequate funds with the small farmers, and their preference for rubber plantations because they do not fall within the purview of the Land Ceiling Bill, etc. Some of these hurdles could be overcome if the State offers long term loans to intending farmers for the purpose of raising fresh plantations. Assuming that loans at the rate of Rs. 1,000 per acre are distributed, the total loan fund required to plant 100,000 acres during the next decade would be around Rs. 10 crores.

2.93. Production of quality seedlings from approved stock in large numbers is also necessary for the programme of under-planting and raising new plantations. The State nurseries, at present, have a capacity of 2.2 lakh seedlings a year. This capacity would not be enough to meet the future needs. It is suggested that the nursery capacity should be doubled during the Third Plan by starting 15 new Government nurseries. This would require an outlay of about Rs. 600,000 during the next two Plans. However, as even these would not be able to meet the anticipated demand, private nurseries may also be encouraged to produce quality seedlings in the different regions of Kerala. As a result of the improvements suggested above, the output of coconuts may be expected to double by 1970-71.

11: India G-4, 5 (1960-1961) 1962 AW11 Kerala AW11

acres to 270,625 acres. This is a proof of the growing popularity of rubber cultivation in Kerala. Increase has also been registered in the tapped area. During 1951–56, the tapped area increased by about 50 per cent (99,120 to 150,000 acres), though the acreage under rubber increased only by 25 per cent. A higher rate of increase in case of tapped area has been caused by maturing of trees planted before 1951.

2.106 *Distribution of Holdings*: The increase in the number of holdings since 1951 has been much more than the increase in acreage under rubber. There were 50,000 estates in 1958 as against 9,026 in 1951. The increase was roughly 500 per cent as against an increase in the area by about 100 per cent only. The consequence is that today rubber industry in Kerala is marked by the existence of a large number of small-size family estates. The increase in area under small estates is not a healthy trend, as these are uneconomic and have low productivity.

2.107 *Production and Yields*: During 1958, the total production of rubber in Kerala was 22,200 tons. The production has been steadily rising at a rate of 8.2 per cent per annum which is indeed a very high rate when compared with growth in the gross agricultural production. (Table 13)

2.108 In 1958 the yield per acre of rubber in Kerala was 294 lbs. which is very low when compared to the yields in Malaya, Ceylon, Indonesia and other rubber growing countries. Compared to 1958, the yield in 1951 was slightly higher standing at 312 lbs. per acre. The decline in yield was partly due to the transfer of Kanyakumari district, which was a high yielding region, to Madras after the reorganization of the States. Partly it was also due to large scale new planting in all the districts except Trichur.

2.109 A significant fact about land productivity is the wide difference in yield rates between big and small estates. In 1958, the average yield of holdings of below 100 acres was only 162 lbs. per acre while in larger holdings it was 486 lbs.

2.110 Low productivity in smaller gardens is due to the inefficient and unscientific manner in which the estates are managed and lack of resources at the disposal of these estate owners. Scientific and efficient management of rubber gardens requires manuring of gardens, periodic renewal of fences, clearance of under-growth, control of soil erosion, etc. For carrying out these operations, it is necessary to have a large fund of working capital which the small growers do not possess. Small growers, particularly those with 10 acres and less, have very little sustaining power and cannot wait for the trees to attain maturity. Consequently, premature tappings and slaughter tappings are too common among the small estates. The small holders are also tempted to grow an understorey when the plants are young and for that they generally prefer tapioca as it is a food crop with high yields. Under cropping even when properly manured, is not good for the soil but when it is considered along with inadequate manuring, the harm can well be imagined. This type of mismanagement generally does not occur in large plantations. It is high time that something is done to improve the situation. Measures such as amalgamating small units into an economic size and working them on a cooperative basis would perhaps meet the needs. The matter should be further investigated and followed up by suitable action.

2.111 The low yield per acre is also due to the cultivation of low yielding varieties and over-ageing of trees. The Rubber Board reported that at the end of 1955, 80

11: India G-4,5 (1960-1961) 1962 AWll Kerala AWll

per cent of over 200,000 acres planted from 1902 onwards belonged to non-selected and low yielding strains. The Board has also estimated that more than half the rubber area contains trees that have outlived their economic life. Therefore, about 164,000 acres need immediate replantation. The total area planted till 1958 was 45,194 acres and of this replanting accounted for only 7,060 acres. To tone up the yields as well as to keep the trees in a good condition, it is necessary to replant at least 20,000 acres annually. A programme of this magnitude would need an investment of Rs. 50 crores at the rate of Rs. 2,500 per acre.

2.112 In certain well managed estates in Kerala, the yields are reported to be as high as 1,600 lbs. per acre. A large number of estates yield between 700 to 1,000 lbs. This shows the potentialities of raising the yields if the gardens are properly managed. There are also instances of estates, which yielded only 150 lbs. per acre, which have yielded 500 to 600 lbs. per acre after reorganization and improvement of the estates.

2.113 India is the only country in the world which is a producer and at the same time an industrial consumer of natural rubber. The indigenous production of natural rubber in India at present meets about half the needs of the country, the other half being met by imports. The demand for rubber is increasing at a very fast rate and is estimated to be 55,000 tons by 1961, 82,000 tons by 1966 and 125,000 tons by 1971.[1] This means that by 1971 the demand for natural rubber would be about eight times the present level of production. It is, therefore, suggested that utmost possible effort should be put in to step up the production of natural rubber in Kerala.

2.114 Rubber production can be raised by increasing the yields as well as by extending the area under the crop. An increase in the yields is a short term measure which can be realized, say, by the end of the Third Plan, provided the necessary measures are quickly implemented. Adequate annual application of fertilizer mixtures (NPK) coupled with soil conservation measures, working the soil and regulated tapping are some of the important measures that may be adopted. These measures can be undertaken more effectively and economically if the holdings are of larger size. Efforts at intensive cultivation should, therefore, be co-ordinated with increase in the size of small holdings—especially the small ones with less than 15 acres. This could be best achieved through the formation of cooperatives. The Government and the Rubber Board should initiate future development on these lines.

2.115 In addition to replantation, as suggested above, a regular plantation programme is necessary for a sustained increase in output. Raising new plantations to the extent of 300,000 acres may be suggested as the target for the next two Plans. A higher target would be only too desirable. There may, however, be some difficulties in implementing the plantation programme owing to scarcity of land. The exact scope for extension of area under rubber is not known. Various sources put the likely extent of this area to be between 2.25 lakh and 7.5 lakh acres. It is, therefore, suggested that the Department of Agriculture and Forestry should conduct a joint survey to make an accurate estimate of the extent of such land in the State. However, it is necessary to emphasise that the proposed plantations should consist of

[1] NCAER estimates.

11: India G-4, 5 (1960-1961) 1962 AWII Kerala AWII

therefore, does not look attractive to the growers. In addition, in some parts where rubber can be grown, cashew is being slowly replaced by rubber, the latter being more profitable. Under these circumstances, since there is no incentive for farmers either to resort to intensive methods of cultivation or to extend the area under cashewnuts, it may not be possible to achieve any significant increase in their output within Kerala. There may, however, be some scope in Cannanore district, for not more than 10,000 acres. Most of this area would be on Government lands under the jurisdiction of Forest and Land Revenue Departments. It is suggested that the proposed plantation should be from clonal progenies of selected parent trees.

2.143 Assuming that 10,000 acres of land is available for cashew planting, total investment necessary to plant this area during 1961–71, at the rate of Rs. 100 per acre, would be Rs. 10 lakhs. The major extension of area under cashewnuts, however, will have to take place in the other States of India, mainly, Andhra Pradesh, Madras and Orissa.

Arecanut

2.144 Arecanut is an important cash crop of Kerala. The State possesses about 50 per cent of total arecanut area in the country. Arecanut is a high value as well as a labour intensive crop.

2.145 The total production of arecanut in the country is about 25 lakh maunds, which falls short of requirements by about one-third. This is made good by imports from Pakistan, Malaya and other countries. The need for conserving foreign exchange resources of India brings out the importance of increasing the production of arecanut.

2.146 Short term as well as long term measures are necessary to raise the output of arecanut. Short term measures are needed to effect a quick increase in the production. Long term measures are necessary for sustaining the gains achieved through short term measures as well as for effecting a progressive increase in the output over a longer period. Adequate manuring, irrigation, and prevention and control of diseases are some of the short term measures, while under-planting or filling in and extending area under the crop are the long term measures.

2.147 Considerable scope exists for raising the output of arecanut by providing irrigation in summer months. It is found that some of the well-managed irrigated gardens yield over Rs. 6,000 worth of produce annually as against Rs. 700 to 800 in unirrigated gardens. At present about 50 per cent of the arecanut area is solely dependent on monsoon rains and only about 25 per cent of the area receives adequate irrigation. Provision of irrigation facilities to arecanut gardens is, therefore, a prime necessity. Since the crop is grown scattered in the valleys and in patches on hill slopes and on small holdings, the irrigation development so far has not benefited the arecanut area to any extent. It is, therefore, suggested that the State should aid arecanut farms by granting long term loans for sinking wells and for the purchase of pumping sets. The gardens being mostly small, it may not be possible for individual garden owners to fully utilize the well and the machinery. This difficulty may perhaps be surmounted by organizing irrigation cooperatives for arecanut gardens.

31: Slater S-5 (1916-1917) 1918 AWI India
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351 useful for cookery are watered and grown in the compound itself; while during the rains also vegetables are grown, such as brinjals, lady's fingers, pumpkins, peas, etc. During summer the trees and vegetables in the compound are watered from the well which is a special feature of every house.

242 *Insect-pests.*—The *caterpillars* of certain moths ate away this year (1916) the tender blades of the paddy as soon as they cropped up from underground. This appeared at the beginning of the sowing season (May) and lasted for a week or two. Farmers here say that these have not appeared for years past. When I wrote to the Agricultural Superintendent of the State at Trichur he suggested the following remedy: "Dig a trench ½ foot wide by 1½ feet deep along the four sides of a field where these insects would fall in their travel from field to field, but would not be able to get out of it."

A kind of fly or flea is said to eat away the juice of the rice at the stalk of the paddy as soon as it reaches the milk stage.

232 *Cattle diseases.*—Sore feet. The feet are well washed with hot water, and turpentine, teak-oil, or cashewnut oil is smeared in the sore; the animal is also made to stand in a muddy place into which the leaves of a certain tree are strewn.

Mouth disease. Pig-ghee or bear-ghee is smeared on the tongue.

Swelling in the belly. The animal without any apparent cause falls down and dies. No medicine is applied in such cases.

Malignant sore-throat and cow-pox are also common.

[654] An Agricultural Department for the State has been established recently at Trichur with a model farm attached to it. The present Superintendent is an England-returned Cochinite. Help is often derived from here, but the farmers themselves are shrewd in practical agriculture.

313 *Timber.*—Wood for fuel, implements, buildings, etc., is obtained from the neighbouring hills and forests. The taluk of Talapilli is full of forests especially on the eastern side. Nearly 43 per cent of the area of the State is forest and its timber is even exported to foreign parts. The Forest Department is a source of income to the State.

[482] Coolies carry faggots of fuel on their heads from the neigh-
[435] bouring hills for sale; sometimes the people get cart-loads; a decent head-load now costs nearly 4 annas and a cart-load from Rs. 2-8-0 to Rs. 3; prices were much lower a few years back. A full head-load is divided into smaller bundles before being sold, and a woman may get six or eight annas for a bundle as heavy as she can carry.

Durable building materials are got from the forests and timber depots, but mango-planks, bamboos and jack-tree planks are also used.

342 *Houses.*—Houses are not built in rows. Every house is surrounded by a compound hedged round by bamboo. Such compounds are intersected by lanes. Rice-straw is used in thatching houses; tiles are replacing thatch but the majority of houses still are thatched. No terraced houses can be seen in these parts where the monsoon rains pour down with full force.

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423 his neighbour seeing the improvements resorts to bribery in ord to get the land.

242 Further this system results in the disregard of agricultur principles. Supposing only ten coconut palms should be plant in a certain portion of land, the possessor actually plants fifteen sixteen because at the end of twelve years he will get the value fifteen or sixteen trees according to the Tenants Improvements A If he is content with planting only ten according to agricultur principles, he gets only the value of ten. For many years pa there has been no attempt towards scientific cultivation, as a cons quence of this, in the whole of Malabar. It is impossible to do s Disregard of science means gain; regard for it means loss. The is an evident deterioration in the production of the land in Malab due to absence of security, and disregard of science. Lan which brought a gain of Rs. 1,000 do not now bring even Rs. 400 Rs. 500. An improvement in this system of land tenure by mea of legislation would evidently increase the fertility of Malabar.

Population.—Total population 7,596.*

162 Castes and individuals in each caste—

Name of caste.	Families.	Members.
Nambudri or Malabar Brahmans	36	146
East Coast Brahmans or Brahmans who have emigrated to Malabar from the east ...	107	653
Nayars and their sub-sects	382	1,305
Tiyyas and their sub-sects	437	2,461
Muhammadans	331	2,307
Christians	118	592
Artisan castes, etc.	17	117
Total ...	1,428	7,581

163 Number of children under ten in families—Living 3,490, de 928.

165 Number of homesteads—1,290.

	1915.	
	Births.	Deaths.
Boys	178	76
Girls	158	80
Total ...	336*	156*

165 The following table of deaths may be useful:—

Children between ages	0—10	87*
Between ages	10—20	2
,,	21—25	8
,,	26—30	8
,,	31—35	6
,,	36—40	4

[Birth-rate ... ... 44·2 per thousand.
Death-rate ... ... 20·5 ,,
Death-rate for children 0—10 ... 259 per thousand births.
Density of population ... ... 3,231 per square mile.—Ed.]

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241 leads to the tree fruiting within two or three years, instead of four or five. The leaves that fall from the trees in gardens are used as green manure in the paddy fields and coconut gardens. No such thing as growing green manure is known. No wood or forest is near so that the people may bring the leaves.

242 In fact very little manuring takes place in the village. What is actually done in the cultivation of chief crops is to plough the land. Every year much is drawn from the soil, and nothing is returned to it. I have stated above that lands which returned Rs. 1,000 a year do not now return more than Rs. 400 or 500. The two most potent causes for this deterioration are the system of land tenure and the absence of manuring. Perhaps the second is the result of the first, but I think the want of agricultural knowledge is the cause of the want of manuring and scientific cultivation.

372 *Wood and fuel.*—The outer cover of the coconut, the leaves of the same, mango trunks, serve for fuel for the whole village, and they are obtained in plenty, but the price is rising with the general rise of prices.

[313] Wood for implements, building, etc., is obtained from Cochin State, brought in carts drawn by oxen or buffaloes.

342 *The village—Houses.*—For buildings granite is obtained from a place four miles distant, mortar is prepared in the village, mud
361 from the village itself, tiles from different places, the least distant being twenty miles away, for thatch the leaves of the coconut are used, iron things are bought in the bazaar. The houses in the village are all isolated from one another. Every part of the village is inhabited except the paddy fields. However, at the present day traders have a tendency to build their houses as near the road as possible and form streets. The people also have a tendency to live as near the temple as possible, and this has resulted in the formation of four streets, surrounding the temple on all the four sides. These streets form also the bazaar of the village. There are here about 100 houses.

361 The lands adjacent to the temple are occupied by Brahmans and Nayars. Any other place can be occupied by any family. The
571 houses of the low castes, high castes, and of other religions are intermingled. The same garden may be occupied by Muhammadans, Hindus and Christians, and they all live very amicably as if they belonged to one and the same religion.

735 The Pariahs, whose families are only three in number, occupy certain portions of the land of a big landlord. The landlord gives the Pariahs free houses and a certain allowance a month. He thinks it incumbent upon him to protect and maintain them. Their huts, though small, are yet tidy and neat. The allowance that was freely given them has now become a right. They follow certain industries and go to rich men's houses to beg twice a month, and they are given a certain quantity of rice.

342 There are 977 thatched houses, 313 tiled houses, no terraced houses.

286 *Crafts and industries.*—There are seven families of weavers consisting of 39 members, i.e., 14 men, 12 women, 13 children under fifteen years. They have been in the village from times long past. They weave a cloth 1 foot wide, 1¼ yards long, and this is used as undercloth. They also at times weave a cloth ¾ or 1

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use. No other manure is used. Green manure is not grown but is got from somewhere or other according to circumstances. Varatties are not made. Wood fuel is the only sort used. 241 [372]

Insect pests.—Of these, the most ruinous is the "Chazhi" the terror of the ryot. The chazhi is a small insect of the locust species half an inch long which in millions appear in a few seasons and spread desolation in the paddy fields. Two remedies are current against this pestilence: (1) catching them directly by drawing a cloth (which serves the purpose of a net) attached to two handsticks over the crops and thus killing them; (2) but by far the most efficacious remedy in the estimation of the cultivator is the putting of a talisman in the fields which a local conjurer (Mandravadi) has prepared for him. What chazhi is to paddy "Mahali" is to the arecanut, the only difference being that in this case nothing is believed to be possible to combat the calamity. 242 [789]

Cattle diseases are (1) hoof disease, (2) Koraladappan (swelling in the neck), (3) Thada (mumps), (4) obstruction of urine and dung, (5) sudden epileptic attacks, and other diseases whose causes and cure are unknown to the peasant. Poisoning is sometimes done by Paraiyas of neighbouring desams for the sake of getting the flesh. For beef is eaten only by this lowest class and when cattle die they will be called to remove the carcase. A number of cattle are annually destroyed by tigers also which often venture into the sheds of the peasants. Talismans and offerings to deities are conceived to be the only remedy. 232 [789]

No assistance is obtained from the Agricultural department, nor any from any veterinary doctor.

Wood is commonly got for all uses from private trees; but the forest also supplies sometimes wood for small necessities. For building purposes, wood is purchased—not from any fixed place. 313

Houses.—The depressed castes have miserable hovels for their houses. A mud wall of five feet height with a ruined roof which can protect the inmate neither from sun nor rain is the order of the day. 342

Except the palatial family homes of the two jenmis, there are no tiled houses. Terracing is not customary here. All other houses are thatched, and thatching is always of straw.

Most houses have gardens surrounding them, where arecanut trees, plantains, mango trees, jack, etc., are grown. They are joyful to look at. 351

The maximum distance of cultivated lands from the home of cultivator is one mile.

An acre of land costs from Rs. 200 to Rs. 300. But purchases on jenmi tenure are worth above Rs. 500. But it is impossible to acquire jenmam property except for jenmis; for the jenmis are jealous guardians of their lands and never sell lands once acquired. Direct threatenings and indirect intimidation are used by them to obtain the jenmam right of lands if held by any lesser landowner. 423 [435]

Subsidiary industries.—Neither weaving nor spinning have ever been practised in this desam. 463

Other crafts—

1. Arrack and jaggery making.
2. Ironsmith.

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237 (called varatties) and used as fuel to supplement firewood, by the poorer classes, who go about picking the stray deposits of cattle-dung in the by-ways and streets. Perhaps a small percentage of cattle-dung is wasted. Yet it is the most important manure and an acre of land uses 100 to 150 baskets of it.

Cattle urine is not used, except by Brahman ladies to a very small extent, in growing kitchen vegetables in their backyards.

The refuse of goat-pens and of fowls (which are kept in most low-class and Nayar houses), as well as bone dust, is used in small quantities for growing garden vegetables.

241 All sorts of green manure are used. About fifty to seventy-five bales of green stuff are used on one acre of land. But green manure is not grown; it is obtained from the neighbouring woods, and the shrubby undergrowth which is commonly found on almost every hillside and in the compounds of houses.

Wood-ash is commonly used, especially in garden cultivation.

Salt is used in coconut plantations.

Chemical manures are unknown in the village.

Garden cultivation is an important item, and very profitable too, though it is not yet carried on very extensively. About 110 acres of land are used for this purpose. Water is obtained mostly from wells, of which there is one or more in every garden. The chief products are coconuts (selling at Rs. 3 to Rs. 5 per 100), arecanuts used for chewing, etc. (Rs. 1½ to Rs. 2 per 1,000), plantains or bananas (Rs. 5 to Rs. 15 per 1,000), jack-fruits (2 to 6 annas each), mangoes, yams and various kitchen vegetables like pumpkins, brinjals, etc. These are cultivated in almost all gardens. Pepper and ginger, betel leaves and turmeric, are also cultivated in all good gardens. Pepper is very valuable and gives a good profit.

[722] Coconuts being largely exported in the form of copra, have fallen 50 per cent in price, through shortage of freight, during the war. This has entailed great hardship on the large classes of coconut growers and workers in the Malabar Coast, this village suffering with the rest.

242 *Insect-pests.*—A kind of beetle sometimes does great damage to the crops—especially the new paddy crops and plantains. Small birds also carry away grains of corn. The usual method of combating them is to keep watch in the fields and drive them off—a very tedious and difficult operation. No help is got from the Agricultural Department, of whose very existence the village is unaware.

232 *Cattle diseases.*—Hoof disease is the commonest and most dangerous. Kerosene oil mixed with lamp black is the popular remedy. There is another disease—a sort of suffocation. A cholera-like disease is also heard of, accompanied by bleeding, etc. Snake-poisoning is another danger, a bite on the nose being supposed to be fatal. The villagers have their traditional methods of combating these. Charms and incantations are used to supplement medicine. No assistance is obtained from the Agricultural Department.

313 *Wood* is obtained from the neighbouring forests, as well as from the clusters of trees in the village. Building timber is often